

PHASE 1 SCREENING PROCESS

Check the appropriate boxes U

Cornerstone(s) assumed degraded:

☐ Initiating Event
 ☒ Mitigation Systems
 ☐ RCS Barrier
 ☐ Fuel Barrier
 ☐ Containment Barrier

If more than one Cornerstone is degraded, then go to Phase 2. If NO Cornerstone is degraded, then the condition screens OUT as “Green” and is not assessed further by this process.

If only one Cornerstone is degraded, continue in the appropriate column below.

<u>Initiating Event</u>	<u>Mitigation Systems</u>	<u>RCS Barrier</u>	<u>Fuel Barrier</u>	<u>Containment Barrier</u>
1. Does the issue contribute to the likelihood of a Primary or Secondary system LOCA initiator? <input type="radio"/> If YES → Go to Phase 2 If NO, continue 2. Does the issue contribute to both the likelihood of a reactor trip AND the likelihood that mitigation equipment will not be available? <input type="radio"/> If YES → Go to Phase 2 <input type="radio"/> If NO, screen OUT	1. Is the issue a design or qualification deficiency that does NOT affect operability per GL 91-18 (rev 1)? <input type="radio"/> If YES → Screen OUT If NO, continue 2. Does the issue represent an actual Loss of Safety Function of a System? <input checked="" type="checkbox"/> <input type="checkbox"/> If YES → Go to Phase 2 If NO, continue 3. Does the issue represent an actual Loss of Safety Function of a Single Train, for > TS AOT? <input type="radio"/> If YES → Go To Phase 2 If NO, continue 4. Does the issue represent an actual Loss of Safety Function of a Single Train of non-TS equipment designated as risk-significant under 10CFR50.65, for > 24 hrs? <input type="radio"/> If YES → Go To Phase 2 <input type="radio"/> If NO, screen OUT	<input type="radio"/> 1. Go to Phase 2	<input type="radio"/> 1. Screen OUT	1. TBD

Result of the Phase 1 screening process: _____ screen OUT as “Green” ☐ go to Phase 2

Important Assumptions (as applicable):

Row	Approx. Freq.	Example Event Type	Estimated Likelihood Rating		
I	>1 per 1 - 10 yr	Reactor Trip Loss of Power Conv. Sys. (loss of condensor, closure of MSIVs, loss of feedwater)	A	B	C
II	1 per 10 - 10 ² yr	Loss of Offsite Power Small LOCA (BWR) (Stuck open SRV only) MSLB (outside cntmt)	B	C	D
III	1 per 10 ² - 10 ³ yr	SGTR Stuck open PORV (PWR) Small LOCA (PWR) (RCP seal failures and stuck open SVs only) MFLB MSLB (inside PWR cntmt)	C	D	E
IV	1 per 10 ³ - 10 ⁴ yr	Small LOCA (pipe breaks) ATWS-PWR (elect only)	D	E	F
V	1 per 10 ⁴ - 10 ⁵ yr	Med LOCA Large LOCA (BWR) ATWS-BWR	E	F	G
VI	<1 per 10 ⁵ yr	Large LOCA (PWR) ATWS-PWR (mech only) ISLOCA Vessel Rupture	F	G	H
			> 30 days	30-3days	<3 days
			Exposure Time for Degraded Condition		

Table 1 - Estimated Likelihood for Initiating Event Occurrence During Degraded Period

Initiating Event Scenarios to be Considered

Affected System	Support Systems	Initiating Event Scenarios
SRVs	air/nitrogen, 125 Vdc	Transient ¹ , LOOP, SLOCA, MLOCA, ATWS
PCS	offsite power, 125 Vdc, TBCCW, air	Transient ¹ , SLOCA
RHR	4160 Vac, 125 Vac, RHRSW, Pump Room HVAC	Transient ¹ , LOOP, ATWS, SLOCA, MLOCA, LLOCA
SBCS	4160 Vac, 125 Vdc, SW	LLOCA, MLOCA, SLOCA, Transient ¹ , LOOP, ATWS
EDGs	125 Vdc, DGCW, EDG HVAC	LOOP
RHRSW	HVAC, 4160 Vac, 480 Vac, 125 Vdc	Transient ¹ , LOOP, ATWS, SLOCA, MLOCA, LLOCA
DGCW	480 Vac	Transient ¹ , LOOP, ATWS, SLOCA, MLOCA, LLOCA
SW	4160 Vac, 125 Vdc, air	Transient ¹ , LOOP, ATWS, SLOCA, MLOCA, LLOCA
TBCCW	SW, air, 4160 Vac	Transient ¹ , SBLOCA,
HPCI	125 Vdc, SW, Room HVAC	Transient ¹ , LOOP, ATWS, SLOCA, MLOCA
CS	4160 Vac, 125 Vdc, SW, Pump Room HVAC	Transient ¹ , LOOP, ATWS, SLOCA, MLOCA, LLOCA
SSMP	SW, HVAC, 4160 Vac	Transient ¹ , LOOP, ATWS
RCIC	125 Vdc, SW, Room HVAC	Transient, ¹ LOOP, ATWS
Air	offsite power, SW	Transient ¹ , LOOP, ATWS, SLOCA, MLOCA, LLOCA
SLC	480 VAC, 125 Vdc	ATWS

¹Note: Transient scenarios should be developed from those transient initiators that could have the greatest risk significance. For example, develop loss of DC bus transient scenarios for degraded 125v DC or AC power equipment, as well as other transient initiators that may depend on equipment being supplied from degraded power sources. The choice of which transient scenarios to develop should generally be apparent from the specific given condition.

PHASE 2 RISK ESTIMATION WORKSHEET

Transients

Estimated Frequency (Table 1 Row) I Exposure time 28 days Table 1 result (circle): A **(B)** C D E F G H

Safety Functions Needed:

Power Conversion System (PCS)

High Press Injection (HPI)

Depressurization (DEP)

Low Press Injection (LPI)

Late Containment Heat Removal (LC)

Full Creditable Mitigation Capability for each Safety Function:

1/3 trains condensate booster pumps etc. (Operator Action)

HPCI or RCIC (1 multi-train system) or SSMP (operator action)

1/5 ADS valves (RVs) manually opened (high stress operator action)

1/4 RHR pumps in LPCI Mode (1 multi-train system) or 1 / 2 LPCS trains (1 multi-train system)

1/4 RHR trains in SPC Mode (1 multi-train system) or SCSS (high stress operator action)

Circle affected functions

Trans - PCS - LC

Recovery of failed train

(RCIC = 0)
(HPCI = 0)

(RCIC = 0)
(HPCI = 0)

Remaining Mitigation Capability Rating for each affected sequence:

(PCS = 2) + (SSMP = 2) + (DEP = 1) Total = 5

(PCS = 2) + (SSMP = 2) + (RHR = 3) + (LPCS = 3) Total = 10

Sequence Color

B5
GREEN
RESULT

GREEN
RESULT

Identify any operator recovery actions¹ that are credited to directly restore the degraded equipment or initiating event:

Note 1: If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and

PHASE 2 RISK ESTIMATION WORKSHEET

SLOCA

Estimated Frequency (Table 1 Row) IV Exposure time 28 days Table 1 result (circle): A B C D **(E)** F G H

<u>Safety Functions Needed:</u>	<u>Full Creditable Mitigation Capability for each Safety Function:</u>
Power Conversion System (PCS)	1/3 trains condensate booster pumps etc. (Operator Action)
High Press Injection (HPI)	HPCI or RCIC (1 multi-train system) or SSMP (operator action)
Depressurization (DEP)	1/5 ADS valves manually opened (high stress operator action)
Low Press Injection (LPI)	1/4 RHR pumps in LPCI Mode (1 multi-train system) or 1 / 2 LPCS trains (1 multi-train system)
Late Containment Heat Removal (LC)	1/4 RHR trains in SPC Mode (1 multi-train system) or SCSS (high stress operator action)

<u>Circle affected functions</u>	<u>Recover of failed train</u>	<u>Remaining Mitigation Capability Rating for each affected sequence:</u>	<u>Sequence Color</u>
SLOCA - PCS - LC			
SLOCA - PCS - HPI - LPI	(RCIC = 0) (HPCI = 0)	(PCS = 2) + (SSMP = 2) + (RHR = 3) + (LPCS = 3) Total = 10	GREEN RESULT
SLOCA - HPI -DEP	(RCIC = 0) (HPCI = 0)	(SSMP = 2) + (DEP = 1) Total = 3	E3 GREEN RESULT

Identify any operator recovery actions¹ that are credited to directly restore the degraded equipment or initiating event:

Note 1: If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and

PHASE 2 RISK ESTIMATION WORKSHEET

Medium LOCA

Estimated Frequency (Table 1 Row) V Exposure time 28 days Table 1 result (circle): A B C D E **(F)** G H

<u>Safety Functions Needed:</u>	<u>Full Creditable Mitigation Capability for each Safety Function:</u>
Early Inventory (EI)	HPCI (1 train) <i>Individual plant sheets should be checked for RCIC and SSMP capability for EI</i>
Early Cont. Control (EC)	Passive operation of SP with 1/8 vacuum breakers (1 multi-train system)
Depressurization (DEP)	Operator opens 1/5 ADS valves (High stress operator action)
Late Inventory Control (LI)	1/4 RHR pumps in LPCI Mode (1 multi-train system) or 1 / 2 LPCS trains (1 multi-train system)
Late Cont. P/T Control (LC)	1/4 RHR trains in SPC Mode (1 multi-train system) or SCSS (High stress operator action)

<u>Affected Sequences (circle affected functions):</u>	<u>Recover of failed train</u>	<u>Remaining Creditable Mitigation Capability for each affected sequence:</u>	<u>Sequence Color</u>
MLOCA - LI			
MLOCA - LC			
MLOCA - EI - DEP	(RCIC = 0) (HPCI = 0)	(DEP = 1) Total = 1	F1 GREEN RESULT
MLOCA - EC			

Identify any operator recovery actions¹ that are credited to directly restore the degraded equipment or initiating event:

Note 1: If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and

PHASE 2 RISK ESTIMATION WORKSHEET

Loss of Offsite Power

Estimated Frequency (Table 1 Row) II Exposure time 28 days Table 1 result (circle): A B (**C**) D E F G H

<u>Safety Functions Needed:</u>	<u>Full Creditable Mitigation Capability for each Safety Function:</u>
Emergency Power (EAC < 5 hrs)	1 / 2 EDGs less than 5 hrs (1 multi-train system)
Emergency Power (EAC > 5 hrs)	1 / 2 EDGs more than 5 hrs (1 multi-train system)
Recovery of LOOP (RLOOP)	Recovery of LOOP (recovery action)
High Press Injection (HPI)	HPCI or RCIC (1 multi-train system) or SSMP (operator action)
Depressurization (DEP)	1/5 ADS valves manually opened (high stress operator action)
Low Press Injection (LPI)	1/4 RHR pumps in LPCI Mode (1 multi-train system) or 1 / 2 LPCS trains (1 multi-train system)
Late Containment Heat Removal (LC)	1/4 RHR trains in SPC Mode (1 multi-train system) or SCSS (high stress operator action)

<u>Circle affected Functions</u>	<u>Recovery of failed train</u> (RCIC = 0) (HPCI = 0)	<u>Remaining Mitigation Capability Rating for each affected sequence:</u>	<u>Sequence Color</u>
LOOP - EAC< 5 hrs - HPI		(EAC = 3) + (SSMP =2) Total = 5	C5 GREEN
LOOP - EAC> 5 hrs - RLOOP			
LOOP - HPI - DEP	(RCIC = 0) (HPCI = 0)	(SSMP =2) + (DEP = 1) Total = 3	C3 WHITE
LOOP - HPI- LPI	(RCIC = 0) (HPCI = 0)	(SSMP =2) + (RHR = 3) + (LPCS = 3) Total = 8	GREEN RESULT
LOOP - LC			

Identify any operator recovery actions¹ that are credited to directly restore the degraded equipment or initiating event:

Note 1: If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and

Estimated Frequency (Table 1 Row) V Exposure time 28 days Table 1 result (circle): A B C D E **(F)** G H

Safety Functions Needed:**Full Creditable Mitigation Capability for each Safety Function:****Over pressure Protection (OVERP)**

9/13 Rvs/SRVs (1 multi-train system)

Reactivity Control (SLC)

SLC (high stress operator action)

High Press Injection (HPI)

HPCI or RCIC (1 multi-train system) or SSMP (operator action)

Depressurization (DEP)

1/5 ADS valves manually opened (high stress operator action)

Inhibit ADS and Lvl Control (INH)

operator inhibits ADS and controls RPV level (High stress operator action)

Containment overpressure protection (LC)

1/4 RHR pumps in SPC (1 multi-train system) or SCSS (high stress operator action)

Circle affected functions**Recovery of failed train****Remaining Mitigation Capability Rating for each affected sequence:****Sequence Color**

ATWS - OVERP

ATWS - SLC

ATWS - HPI - DEP

(RCIC = 0)
(HPCI = 0)

(SSMP = 2) + (DEP = 1) Total = 3

F3
GREEN

ATWS - INH

ATWS - LC

Identify any operator recovery actions¹ that are credited to directly restore the degraded equipment or initiating event:

Note 1: If operator actions are required to credit placing mitigation equipment in service or for recovery actions, such credit should be given only if the following criteria are met: 1) sufficient time is available to implement these actions, 2) environmental conditions allow access where needed, 3) procedures exist, 4) training is conducted on the existing procedures under conditions similar to the scenario assumed, and 5) any equipment needed to complete these actions is available and

Remaining Mitigation Capability Rating (with Examples)							
Initiating Event Likelihood	6	5	4	3	2	1	0
	3 diverse trains OR 2 multi-train systems OR 1 train + 1 multi-train system + recovery of failed train	1 train + 1 multi-train system OR 2 diverse trains + recovery of failed train	2 diverse trains OR 1 multi-train system + recovery of failed train	1 train + recovery of failed train OR 1 multi-train system OR Operator action + recovery of failed train	1 train OR Operator action OR Operator action under high stress + recovery of failed train	Recovery of failed train OR Operator action under high stress	none
A	Green	White	Yellow	Red	Red	Red	Red
B	Green	Green	White	Yellow	Red	Red	Red
C	Green	Green	Green	White	Yellow	Red	Red
D	Green	Green	Green	Green	White	Yellow	Red
E	Green	Green	Green	Green	Green	White	Yellow
F	Green	Green	Green	Green	Green	Green	White
G	Green	Green	Green	Green	Green	Green	Green
H	Green	Green	Green	Green	Green	Green	Green

Table 2 - Risk Significance Estimation Matrix (rev 6/10/99)